

In accordance with the Examiner's recommendation, Applicants have amended the first sentence of the specification to correctly identify the continuing data. Furthermore, Applicants are in the process of obtaining a new Declaration and respectfully request this objection be held in abeyance until allowable subject matter is indicated.

The Office Action rejects claims 1 and 18-30 under 35 U.S.C. §112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. This rejection is respectfully traversed.

Claims 1 and 18-19 are cancelled. Furthermore, claims 20, 23, 25, 26 and 28 have been amended to more specifically recite configurations of the plasma.

Accordingly, Applicants respectfully submit that the claims are definite and request reconsideration and withdrawal of the rejections of claims 19-30 under 35 U.S.C. §112, second paragraph.

The Office Action rejects claims 1 and 18-30 under the judicially created doctrine of obviousness-type double patenting as unpatentable over claims 1-25 of U.S. Patent No. 6,001,431. Applicants respectfully requests this rejection be held in abeyance until the indication of allowable subject matter.

The Office Action rejects claims 1 and 18-30 under 35 U.S.C. §103(a) as unpatentable over Takahashi et al. in view of Yamagihara et al. and further in view of Venkataramanan et al. This rejection is respectfully traversed.

Applicants respectfully submit the rejection of claims 1 and 18-19 is moot. In relation to claims 19-30, Applicants respectfully submit that a basic feature of the present invention resides in the use of a localized plasma to treat a surface of a substrate. In particular, the localized plasma is formed by the use of a slit-like gas inlet or a plurality of gas inlets arranged in one direction. The formation of the localized plasma can be facilitated, for example, by forming an edge of the gas inlet sharply, at least as discussed on page 7, line 13, or by narrowing the gap between the electrodes, at least as disclosed on page 7, lines 16-17. Applicants respectfully submit it should be noted that the localized plasma is different from a conventional plasma

region which widely spreads over the entire space between the electrodes, for example, as recited on page 15, lines 5-7 of the specification.

Applicants respectfully submit that the cited references either alone or in combination, fail to at least teach, suggest or disclose “said plasma extends from the first electrode towards the second electrode and a cross section of the plasma along planes of the first and second electrodes has a length along the first direction and a width along the second direction perpendicular to the first direction where the cross section is elongated in the first direction and the length is longer than the width...” as recited in claim 20, “... wherein the plasma extends from the first electrode towards the second electrode, and a region of the plasma is elongated more in the first direction than in the second direction,” as recited in claim 23, “... wherein said plasma has an elongated cross section along the first direction... and treating said substrate with said plasma while changing a relative location of the substrate with respect to the plasma in a second direction perpendicular to the first direction...” as recited in claim 25 and “...wherein said plasma extends from the first electrode towards the second electrode and a cross section of the plasma has a length along the first direction and a width along the second direction perpendicular to the first direction where the length is longer than the width ...” as recited in claim 28.

Accordingly, since the cited references, either alone or in combination fail to teach, suggest or disclose the plasma configuration as claimed, the cited references fail to render obvious claims 19-30. Withdrawal of the rejection of claims 19-30 under 35 U.S.C. §103(a) is respectfully requested.

The Office Action rejects claims 1 and 18-30 under the judicially created doctrine of obviousness-type double patenting as unpatentable over claims 1-2, 4-5, 7-9 and 11-15 of U.S. Patent No. 6,001,432. Applicants respectfully request this rejection to be held in abeyance until the indication of allowable subject matter.

The Office Action rejects claims 1 and 18-30 under the judicially created doctrine of obviousness-type double patenting as unpatentable over claims 1, 3-4, 7, 10, 13 and 17, or claims 1, 2, 7-8, 10-12, 16, 17, 20-24 and 27-68, respectfully, of U.S. Patent No. 5,766,696 or U.S.

Patent No. 6,183,816 in view of Wayagihara. Again, Applicants respectfully requests this rejection be held in abeyance until the indication of allowable subject matter.

Accordingly, Applicants respectfully submit that claims 19-41 are in condition for allowance. Favorable reconsideration and prompt allowance are respectfully requested.

Should the Examiner believe anything further is desirable in order to place this application in even better condition for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the telephone number below.

Respectfully submitted,

NIXON PEABODY LLP



Jason H. Vick
Registration No. 45,285

NIXON PEABODY LLP
8180 Greensboro Drive, Suite 800
McLean, VA 22102
(703) 790-9110

MARKED UP VERSION OF THE SPECIFICATION

Please replace the first sentence of the specification, "This application is a Divisional of U.S. Patent No. 6,001,431, filed February 21, 1996, which itself is a continuation of Application Serial No. 08/173,961, filed December 28, 1993, now abandoned." with the following --This application is a divisional U.S. Application Serial No. 08/604,713, now U.S. Patent No. 6,001,431, filed February 21, 1996, which itself is a Continuation of U.S. Application Serial No. 08/173,961, filed December 28, 1993, now abandoned.--

MARKED UP VERSION OF THE CLAIMS

20. (Amended) A process [for treating a substrate with a plasma] comprising the steps of:

preparing first and second electrodes opposed to each other in a reaction chamber, said first electrode having a plurality of gas inlets arranged in a first direction;

introducing a [reactive] gas through said plurality of gas inlets into said reaction chamber;

generating a plasma of said reactive gas by applying a voltage between said first and second electrodes wherein said plasma [is localized in the vicinity of said plurality of gas inlets] extends from the first electrode toward the second electrode and a cross section of the plasma along planes of the first and second electrodes has a length along the first direction and a width along a second direction perpendicular to the first direction where the cross section is elongated in the first direction and the length is longer than the width;

placing a substrate between said first and second electrodes; and

[moving said substrate while treating said substrate with said] changing a relative location of the substrate with the plasma in [a] the second direction [perpendicular to said first direction].

23. (Amended) A process for [treating a substrate with a plasma] comprising the steps of:

preparing first and second electrodes opposed to each other in a reaction chamber, said first electrode having a plurality of gas inlets arranged in a first direction;

introducing a [reactive] gas through said plurality of gas inlets into said reaction chamber;

generating a plasma of said reactive gas by applying a voltage between said first and second electrodes wherein [said plasma is localized in the vicinity of said plurality of gas inlets and] said first electrode is grounded;

placing a substrate adjacent to said second electrode; [and]

forming a diamond-like carbon film on the substrate by plasma chemical vapor deposition using the plasma; and

moving said substrate while [treating said substrate with said plasma] forming the diamond-like carbon film on the substrate in a second direction perpendicular to said first direction[, thereby, forming a diamond-like carbon film on said substrate],

wherein the plasma extends from the first electrode toward the second electrode, and a region of the plasma is elongated more in the first direction than in the second direction.

25. (Amended) A process [for treating a substrate with a plasma] comprising the steps of:

preparing first and second electrodes opposed to each other in a reaction chamber, said first electrode having a plurality of gas inlets arranged in a first direction;

introducing a [reactive] gas through said plurality of gas inlets into said reaction chamber;

generating a plasma of said [reactive] gas by applying a voltage between said first and second electrodes wherein said plasma [is localized in the vicinity of said plurality of gas inlets] has an elongated cross section along the first direction;

placing a substrate between said first and second electrodes; and

treating said substrate with said plasma while changing a relative location of the substrate with respect to the plasma in a second direction perpendicular to the first direction,

wherein a gap between said first and second electrodes is 30 mm or less, and the substrate is not in contact with the plasma during the treatment with the plasma.

26. (Amended) The process according to claim 25 wherein said [gas] gap is 10 mm or less.

28. (Amended) A process [for treating a substrate with a plasma] comprising the steps of:

preparing first and second electrodes opposed to each other in a reaction chamber, said first electrode having at least one [slit-like] inlet having an opening elongated in a first direction;

introducing a [reactive] gas through said [slit-like] inlet into said reaction chamber;

generating a plasma of said [reactive] gas by applying a voltage between said first and second electrodes wherein said plasma [is localized in the vicinity of slit-like inlet] extends from the first electrode toward the second electrode and a cross section of the plasma has a length along the first direction and a width along a second direction perpendicular to the first direction where the length is longer than the width;

placing a substrate between said first and second electrodes; [and]

treating said substrate with said plasma, and

changing a relative location of the substrate with respect to the plasma in the second direction during the treatment with the plasma,

wherein a gap between said first and second electrodes is 30 mm or less.